In The Claims:

1. (currently amended) A method in a data processing system having a program for determining the orientation of a natural fracture in the Earth, the method comprising the steps of:

receiving, at a sensor in an observation well, a far-field point-source signal profile for a microseismic event;

extracting in the time-domain, a data attribute information from [a]the far-field point-source signal profile for a microseismic event; and

calculating in the time-domain, an estimate of the orientation of the natural fracture based on the extracted data attribute information.

2. (original) The method according to claim 1, wherein the estimate of the orientation of the natural fracture is calculated using a constrained non-linear inversion.

3. (original) The method according to claim 1, wherein the calculated estimate of the orientation of the natural fracture includes at least one of a failure mode, a failure plane orientation, and a scalar moment.

4. (original) The method according to claim 1, further comprising the step of: receiving the far-field point-source signal profile.

5. (original) The method according to claim 1, further comprising the step of: resolving an order ambiguity in the calculated estimate of the orientation of the natural fracture.

6. (currently amended) The method according to claim 1, wherein the data attribute information comprises [of] at least two of a ratio of a shear wave vertical component amplitude to a compressive wave amplitude, a ratio of the shear wave vertical component amplitude to the shear wave horizontal component amplitude, a ratio of a shear wave vertical component sign to a shear wave horizontal component sign, and an estimated location of the source.

7. (original) The method according to claim 1, wherein calculating the estimate of the orientation of the natural fractures comprises calculating theoretical amplitude ratios and a sign profile of the ratio of the

shear wave vertical component to the shear wave horizontal component based on a location of the microseismic event and a location of a sensor for detecting the microseismic event.

8. (currently amended) A computer-readable medium containing instructions that cause a data processing system having a program to perform a method comprising the steps of:

generating a local microseismic event;

extracting in the time-domain, a data attribute information from a far-field point-source signal profile for [a]the microseismic event; and

calculating in the time-domain an estimate of the orientation of the natural fracture based on the extracted data attribute information.

9. (original) The computer-readable medium according to claim 8, wherein the estimate of the orientation of the natural fracture is calculated using a constrained non-linear inversion.

10. (original) The computer-readable medium according to claim 8, wherein the calculated estimate of the orientation of the natural fracture includes at least one of a failure mode, a failure plane orientation, and a scalar moment.

11. (original) The computer-readable medium according to claim 8, further comprising the step of: receiving the far-field point-source signal profile.

12. (original) The computer-readable medium according to claim 8, further comprising the step of: resolving an order ambiguity in the calculated estimate of the orientation of the natural fracture.

13. (original) The computer-readable medium according to claim 8, wherein the data attribute information comprises at least two of a ratio of a shear wave vertical component amplitude to a compressive wave amplitude, a ratio of a shear wave horizontal component amplitude to the compressive wave amplitude, a ratio of a shear wave vertical component sign to a shear wave horizontal component sign, a ratio of the shear wave vertical component amplitude to the shear wave horizontal component amplitude, and an estimated location of the source.

14. (original) The computer-readable medium according to claim 8, wherein calculating the estimate of the orientation of the natural fractures comprises calculating theoretical amplitude ratios and a sign profile of the ratio of the shear wave vertical component to the shear wave horizontal component based on a location of the microseismic event and a location of a sensor for detecting the microseismic event.

15. (currently amended) A data processing system comprising:

a memory comprising a program that extracts in the time-domain a data attribute information from a far-field point-source signal profile for a microseismic event, and calculates in the time-domain an estimate of the orientation of [the]a single natural fracture based on the extracted data attribute information; and

a processing unit that runs the program.

16. (original) The data processing system according to claim 15, wherein the estimate of the orientation of the natural fracture is calculated using a constrained non-linear inversion.

17. (original) The data processing system according to claim 15, wherein the calculated estimate of the orientation of the natural fracture includes at least one of a failure mode, a failure plane orientation, and a scalar moment.

18. (original) The data processing system according to claim 15, wherein the program receives the far-field point-source signal profile.

19. (original) The data processing system according to claim 15, wherein the program resolves an order ambiguity in the calculated estimate of the orientation of the natural fracture.

20. (original) The data processing system according to claim 15, wherein the data attribute information comprises at least two of a ratio of a shear wave vertical component amplitude to a compressive wave amplitude, a ratio of a shear wave horizontal component amplitude to the compressive wave amplitude, a ratio of a shear wave vertical component sign to a shear wave horizontal component sign, a ratio of the shear wave vertical component amplitude to the shear wave horizontal component amplitude, and an estimated location of the source.

21. (original) The data processing system according to claim 15 wherein calculating the estimate of the orientation of the natural fractures comprises calculating theoretical amplitude ratios and a sign profile of the ratio of the shear wave vertical component to the shear wave horizontal component based on a location of the microseismic event and a location of a sensor for detecting the microseismic event.

22. (currently amended) A data processing system comprising:

means for receiving, in an observation well, a far-field point-source signal profile for a microseismic event;

means for extracting in the time-domain a data attribute information from [a]the far-field point-source signal profile for a microseismic event; and

means for calculating in the time-domain an estimate of the orientation of the natural fracture based on the extracted data attribute information.